

WHAT IS CLAIMED IS:

1. A UV-reflective interference layer system for transparent substrates with broadband antireflection in the visible wavelength range, the interference layer system comprising at least four individual layers, wherein consecutive layers have different indices of refraction and the individual layers contain UV and temperature-stable inorganic materials, characterized in that the interference layer system comprises five individual layers with the following structure:
substrate/M1/T1/M2/T2/S, wherein substrate designates the transparent substrate, M1, M2 denote layers with intermediate index of refraction, T1, T2 denote layers with high index of refraction, S denotes a layer with low index of refraction, and for a reference wavelength of 550 nm the indices of refraction of the individual layers lie in the following range:
$$n_{\text{low}} \leq 1.6$$
$$1.6 > n_{\text{intermediate}} < 1.8$$
$$1.9 \leq n_{\text{high}}$$
and
the thickness of the individual layers lies in the following range:
for the layer M1: $70 \text{ nm} \leq d_{\text{M1}} \leq 100 \text{ nm}$
for the layer T1: $30 \text{ nm} \leq d_{\text{T1}} \leq 70 \text{ nm}$
for the layer M2: $20 \text{ nm} \leq d_{\text{M2}} \leq 40 \text{ nm}$
for the layer T2: $30 \text{ nm} \leq d_{\text{T2}} \leq 50 \text{ nm}$
for the layer S: $90 \text{ nm} \leq d_{\text{S}} \leq 110 \text{ nm}$.
2. The interference layer system according to claim 1, further characterized in that the inorganic materials are inorganic oxides.
3. The interference layer system according to claim 1, further characterized in that the inorganic oxides are largely transparent above a wavelength of light of 320 nm.

4. The interference layer system according to claim 1, further characterized in that the individual layers comprise one or more materials or mixtures of the following groups of inorganic oxides:
TiO₂, Nb₂O₅, Ta₂O₅, CeO₂, HfO₂, SiO₂, MgF₂, Al₂O₃, ZrO₂.
5. The interference layer system according to claim 1, further characterized in that the layers comprise the following materials:
the high-refracting layer with n_{high} , TiO₂
the low-refracting layer with n_{low} , SiO₂
and the intermediate-refracting layer with $n_{\text{intermediate}}$, a mixture of TiO₂ and SiO₂.
6. The interference layer system according to claim 1, further characterized in that the high-refracting individual layers with n_{high} comprise one or more of the following materials: Nb₂O₅, Ta₂O₅, CeO₂, HfO₂, as well as mixtures of these with TiO₂, the low-refracting layers contain the following materials:
MgF₂ or mixtures of MgF₂ with SiO₂, and the intermediate-refracting layers contain one or more of the following materials:
Al₂O₃, ZrO₂.
7. A UV-reflective glass with an interference layer system according to claim 1 and a transparent substrate, wherein the transparent substrate is soft glass in the form of float glass, including iron-poor form.
8. A UV-reflective glass with an interference layer system according to claim 1 and a transparent substrate, wherein the transparent substrate is a hard glass, especially aluminosilicate and borosilicate hard glass.

9. A UV-reflective glass with an interference layer system according to claim 1 and a transparent substrate, wherein the transparent substrate is quartz glass.
10. A UV-reflective thermal protection glass, comprising at least one transparent substrate, wherein the substrate has a heat-reflecting coating on at least one side, which has a surface resistance $< 20 \Omega$, characterized in that the substrate, which has a heat-reflecting coating on at least one side, moreover has at least one UV-reflective interference layer system according to claim 1.
11. The UV-reflective thermal protection glass according to claim 10, further characterized in that the UV-reflective interference layer system is deposited onto the heat reflecting interference layer system.
12. The UV-reflective thermal protection glass according to claim 10, further characterized in that the UV-reflective interference layer system is deposited directly on the substrate, and a heat-reflecting layer with a surface resistance $< 20 \Omega$ is deposited on the UV-reflective interference layer.
13. The UV-reflective thermal protection glass according to claim 10, further characterized in that the UV transmission of the thermal protection glass in the UV range of 280-380 nm is less than 8% and in the visible wavelength range it is greater than 90%.
14. The UV-reflective thermal protection glass according to claim 10, further characterized in that the heat-reflecting coating comprises one or more of the following materials:
SnO₂:F,Sb
ZnO:Al

$\text{In}_2\text{O}_3:\text{Sn}$

Ag-based coating.

15. The UV-reflective thermal protection glass according to claim 10, further characterized in that the heat transfer value of the thermal protection glass is smaller than $3.5 \text{ W/m}^2\text{K}$.
16. The UV-reflective thermal protection glass according to claim 10, further characterized in that the UV thermal protection glass comprises two transparent substrates yielding a double-pane insulated glass, wherein at least one side of one of the transparent substrates has a heat-reflecting layer and at least three sides of the two substrates comprise the reflective interference layer system.
17. The UV-reflective thermal protection glass according to claim 16, further characterized in that the double-pane insulated glass has a small k-value of less than $1.0 \text{ W/m}^2\text{K}$ and a UV transmission of less than 4% and a visible transmission in the visible wavelength range of greater than 85%.
18. A method for coating a substrate, a transparent substrate with a coating system according to claim 1, characterized in that the deposition of the individual layers is performed by a dip or spin method of sol-gel techniques.
19. A method for the coating of a substrate, a transparent substrate with an interference layer system according to claim 1, characterized in that the deposition of the individual layers is performed by means of cathode sputtering, physical vaporization, or chemical gas-phase deposition, especially ion or plasma-assisted.

20. The method according to claim 18, further characterized in that the substrate is coated on both sides.
21. The method according to claim 18, further characterized in that one side of the substrate is covered and the substrate is only coated on one side.
22. Use of an interference layer system according to claim 1 for the coating of panes for glazings.
23. Use of an interference layer system according to claim 1 for the coating of light bulbs in the lighting industry.
24. Use of an interference layer system according to claim 1 for the coating of tubular casings for lamps or front panels made of hard or soft glass.